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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/782,339	02/13/2001	Masahiko Hirose	04558/048001	7852

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EXAMINER

MENON, KRISHNAN S

ART UNIT	PAPER NUMBER
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1723

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DATE MAILED: 02/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/782,339

Applicant(s)

HIROSE ET AL.

Examiner

Krishnan S Menon

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-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 November 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

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### DETAILED ACTION

The examiner acknowledges that the date on the referenced communication as January 7, 2002 in the first action was in error; a change of address letter was received in March 6, 2002 and entered in file in July 1 2002.

Claims 1-20 are pending in this application.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
1. Claims 1,2,4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tonelli (US 5,997,745) in view of Al-Samadi (US 6,113,797)

Tonelli (745) discloses a system comprising a plurality of membrane modules in multistage (Fig 1), each module being spirally wound with polyamide membrane (col 4:26-50); including one final and one pre-final stage with at least a portion of permeate from pre-final stage fed in to the

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final stage (fig 1; col 4:26-50). Tonelli (745) also discloses the permeate water fed to the final stage at pH 8.5, as in claims 4 and 5.

Tonelli (745) does not specifically state mixing a rest of the permeated water from the pre-final stage with the final stage permeated water as in instant claim 1 and 2. Al-Samadi (797) teaches treating a part of the permeated water from a pre-final stage through a final stage membrane and mixing the rest of the permeated water from the pre-final stage with permeated water from the final stage (fig 2 lines 15, 25 and 26). It would be obvious to one of ordinary skill in the art at the time of invention to treat only part of the permeated water from the pre-final stage with the final stage membrane and mix the rest with the final stage permeated water as taught by Al-Samadi (797) in the teaching of Tonelli (745) for obtaining the required purity.

2. Claims 3, 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tonelli (745) in view of Al-Samadi (797) as in claim 1 above and further in view of Bray (US 4,046,685).

Tonelli (745) in view of Al-Samadi (797) does not teach splitting the permeate stream from the pre-final stage to two and feeding only one of them to the final stage. Bray (685) teaches (Fig 1,2 and col 5: 4-35) the splitting of the permeate stream to two separate streams, taking first permeate stream, having a lower salt content, from the feed (upstream) end and the second permeate stream having a higher salt content from the retentate end. Bray (685) has a string of modules in a housing, connected in series by the permeate tube, with the feed from one end of the housing and the permeate from the other end. His means for splitting the permeate stream blocking the through passage in the permeate tube link at a convenient location inside the housing so that the two permeate streams have a substantially different salt content. The ratio of the salt content in Bray's teachings is 2:1 (Fig 2).

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It would be obvious to one of ordinary skill in the art at the time of invention to use the Bray (685) teachings to split the permeate flow from a pressure vessel having a string of modules and then feed only that part of the split flow which has the higher salt concentration to the next/final reverse osmosis membrane stage to “advantageously employ” the apparatus (see Bray abstract) in the teaching of Tonelli (745) in view of Al-Samadi (797).

3. Claims 11-16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tonelli (745) in view of Al-Samadi (797) as in claim 1 above and further in view of EP(1 136 116 A1).

Tonelli (745) in view of Al-Samadi (797) does not teach treating seawater in particular and does not disclose the performance values of the membranes used for seawater and for rejection of Boron. EP(116) teaches the types of membranes to be used, their performance values for seawater and for Boron separation, and particularly, membrane containing Bromine atoms. The membrane performance values in EP (116) are better than 99.5% salt rejection from water at 3.5% salt content at 25C and pH 6.5 with better than 0.3/m<sup>2</sup>/day of flux at 5.5 Mpa, and boron rejection better than 92% at 5ppm feed.

It would be obvious to one of ordinary skill in the art at the time of invention to use the membrane taught by EP (116) with the teachings of Tonelli (745) in view of Al-Samadi (797) for obtaining the desired Boron separation.

4. Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tonelli (745) in view of Al-Samadi (797) and Bray (685) as applied to claim 3 above, further in view of EP (116).

Tonelli (745) in view of Al-Samadi (797) and Bray (685) as applied to claim 3 above does not disclose treating seawater with the apparatus. EP(116) discloses a membrane that treats the seawater

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to reduce the TDS sufficiently and Boron to  $< 1$  ppm. One of ordinary skill in the art at the time of invention would chose the membrane taught by EP(116) with the teaching of Tonelli (745) in view of Al-Samadi (797) as in claim 1 above and further in view of Bray (US 4,046,685) for the desired separation of Boron from sea water.

### *Response to Arguments*

Applicant's arguments with respect to claim 1-20 have been considered but are moot in view of the new ground(s) of rejection.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S Menon whose telephone number is 703-305-5999. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L Walker can be reached on 703-308-0457. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

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Krishnan S. Menon

Patent Examiner

January 27, 2003



W. L. WALKER

SUPERVISORY PATENT EXAMINER

TECHNOLOGY CENTER 1700